

WHAT IS CLAIMED IS:

1. A ferroelectric transducer for use with a ferroelectric storage medium, comprising:
a read electrode configured to carry an electrical charge of a first charge polarity orientation proximate a ferroelectric domain of the ferroelectric storage medium which has a second charge polarity orientation; and
wherein the ferroelectric domain changes polarity and an electrical readback current flows in the read electrode when the first charge polarity orientation and the second charge polarity orientation are opposite.
2. The apparatus of claim 1 including a shield which extends around the read electrode.
3. The apparatus of claim 1 including:
a write electrode configured to apply an electric field to the ferroelectric medium to thereby impress an electrical polarization on ferroelectric domains of the ferroelectric medium; and
wherein the write electrode trails the read electrode and is configured to impress the second charge polarity on the ferroelectric domain following a read operation in which the charge polarity of the ferroelectric domain was changed.
4. The apparatus of claim 3 including a shield which extends between the read electrode and the write electrode.
5. The apparatus of claim 1 wherein the write electrode and read electrode in a dielectric material.
6. The apparatus of claim 1 including a controller configured to apply the electrical charge to the read electrode and sense the readback current.

7. The apparatus of claim 3 including a controller configured to apply a charge to the write electrode following a read operation in which the charge polarity of the ferroelectric domain was changed.
8. A data storage system including a ferroelectric transducer in accordance with claim 1 configured to move relative to a storage medium having a surface of a ferroelectric material.
9. The apparatus of claim 8 wherein the transducer is carried on a slider proximate the surface.
10. The apparatus of claim 9 wherein the slider is configured to wear until an equilibrium is reached during operation.
11. The apparatus of claim 9 wherein the slider includes a trim region proximate a trailing edge of the slider.
12. The apparatus of claim 11 wherein the ferroelectric transducer is positioned proximate the trim region, whereby the trim region is positioned between the ferroelectric transducer and the trailing edge of the slider.
13. A storage system comprising:
 - a ferroelectric storage medium;
 - an array of ferroelectric transducers in accordance with claim 1; and
 - an actuator configured to move the storage medium relative to the array.
14. A method of reading data stored on a ferroelectric storage medium, comprising:
 - applying an electric charge to a read electrode placed proximate a ferroelectric domain having a first charge polarity on the ferroelectric medium; and
 - sensing an electrical current in the read electrode due to the charge polarity of the ferroelectric domain switching from the first charge polarity to a second

charge polarity when the first charge polarity is the same as a charge polarity of the read electrode.

15. The method of claim 14 including providing a shield which extends around the read electrode.

16. The method of claim 14 including:
positioning a write electrode proximate the ferroelectric domain; and
applying an electric charge to the write electrode in response to sensed electrical current in the read electrode to impress the first charge polarity on to the ferroelectric domain.

17. The method of claim 16 including providing a shield which extends between the read electrode and the write electrode.

18. The method of claim 14 wherein the read electrode is carried in a dielectric material.

19. A disc storage system including a ferroelectric transducer implementing the method of claim 14.

20. The method of claim 19 including carrying the transducer on a slider proximate the disc surface.

21. The method of claim 20 including wearing a trailing edge of the slider until an equilibrium is reached.

22. The method of claim 21 wherein the slider includes a trim region proximate a trailing edge of the slider.

23. The method of claim 22 wherein the ferroelectric transducer is positioned proximate the trim region, whereby the trim region is positioned between the ferroelectric transducer and the trailing edge of the slider.
24. The method of claim 14 including moving the ferroelectric storage medium relative to an array of read electrodes.
25. A ferroelectric transducer for use with a ferroelectric storage medium, comprising:
a read electrode means placed proximate a ferroelectric domain having a first charge polarity on the ferroelectric medium the read electrode means for sensing electrical charge of the ferroelectric domain; and
means for sensing an electrical current from in the read electrode means due to the charge polarity of the ferroelectric domain switching from the first charge polarity to a second charge polarity when the first charge polarity is the same as a charge polarity of the read electrode means.
26. The apparatus of claim 25 including a write electrode means for writing an electrical charge to a ferroelectric domain of the medium.
27. The apparatus of claim 26 including:
means for applying an electric charge to the write electrode means in response to sensed electrical current from the read electrode means to thereby impress the first charge polarity on to the ferroelectric domain.
28. The apparatus of claim 26 including a shield means for shielding the read and write electrodes.